



ON *EUCALYPTUS MELANOPHLOIA*, F.v.M., AND ITS
COGNATE SPECIES.

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(Plate xi.)

This species was originally described by Mueller in 1858 (Journ. Linn. Soc. iii. 93); and Bentham in the 'Flora Australiensis' (iii. 220) reproduced this description.

In the above and all later references to this tree in scientific literature, it is always described or mentioned as having uniformly cordate, sessile leaves throughout its life; and such was my experience of it until the research on Eucalypts recently completed at the Technological Museum proved that such was not the case.

It appears now that the original description applies only to one form of this tree's life-history, *i.e.*, the opposite, sessile, cordate stage; and this being the only described form up till now it can be easily understood how, as regards its foliage, it was taken to belong to that class of Eucalypts having similar leaves. This includes such Eucalypts as *E. cordata*, Labill., and *E. pulverulenta*, Sims, for Eastern Australia; and, as far as at present known, no lanceolate leaves have ever been found to occur on them.

It can now be shown that *E. melanophloia*, F.v.M., on a morphological classification of foliage, must be grouped with *E. dives*, Schau., *E. Risdoni*, Hook. f., *E. cinerea*, F.v.M., and others, all of which in the sessile, cordate-leaved stage, bear both buds, flowers and fruits; and it is a coincidence that *all* these, as well as this species, should have been described originally from this particular leaf-stage. It is now also known that all and each of

these develop lanceolate, alternate leaves as the trees attain a maximum height.

As stated above, *E. cordata*, Labill., and *E. pulverulenta*, Sims, are the only two Eucalypts in Eastern Australia and Tasmania which preserve the sessile, cordate form or shape of leaf throughout their life-history. The other species also recorded as possessing this character are:—*E. setosa*, Schau., Gulf of Carpentaria; *E. gamophylla*, F.v.M., Northern Territory, S.A.; *E. macrocarpa*, Hook. f., West Australia; and *E. pruinosa*, Schau., Gulf of Carpentaria. I know nothing of the life-history of these species; but possibly future research may also show that some at least develop lanceolate leaves in their mature stages of growth.

The lanceolate form of leaf of *E. melanophloia*, F.v.M., first came under my notice in January, 1900, in the shape of material collected at Coolabah, and also between Girilambone and Cobar, by Mr. Bäuerlen, the Museum Collector, and forwarded under the name of "Ironbark." At that time it was not even suspected of being *E. melanophloia*; and as the specimens did not agree with any species known to me, its naming and investigation were held over.

Later, having occasion to collect material of *E. melanophloia* at Narrabri, the "Silver-leaf Ironbark" of that district and a species well known there by its cordate, sessile, opposite leaves, it was found that *E. microtheca*, F.v.M., occurred there also, and was known vernacularly as "Swamp Box." Amongst some of the material of this latter species forwarded for oil-investigation were found leaves identical with the "Ironbark" of the West above mentioned. The very greatest care had then to be exercised that none but true leaves of *E. microtheca* were distilled, and several distillations were undertaken in order to verify the results.

The lanceolate form of leaves corresponding to the Western "Ironbark" were next traced to their botanical source, which turned out to be none other than *E. melanophloia*, and which species was found to have a complete gradation of leaves from the narrow-lanceolate to sessile-cordate, and also that the far Western "Ironbark" is the same species, only differing in having a lanceo-

late form of leaf throughout its life. At Narrabri the trees of *E. melanophloia* having all lanceolate leaves, are not easily distinguished from those of *E. microtheca*, as the barks are also identical; in herbarium material, however, the leaves of the latter species can easily be separated from the former, as they always dry a light slate colour in contradistinction to the brownish colour of those of the "Ironbark."

The fruits of each are characteristically distinct, as mentioned by all writers on the species. Although *E. melanophloia* is now shown to possess such a variation in foliage, no such variability is known or recorded of *E. microtheca*, which is probably one of, if not the most widely distributed species in Australia, occurring as it does in the northern interior half of New South Wales, Western Queensland, Northern Territory of South Australia into the northern parts of Western Australia.

Bentham (*loc. cit.*), under *E. melanophloia*, states "the species is very nearly allied to *E. crebra*, and may prove to be an opposite-leaved state of the form described as the 'Mackenzie River Box-tree.' It sometimes resembles *E. cinerea*, F.v.M., but differs in the bark, the stamens, and the fruit."

Under *E. crebra*, F.v.M., Bentham also states:—" 'Box-tree' of the Mackenzie River, *Leichhardt*, also on the Suttor River, *Bowman*, described by both as having the bark persistent and fissured. The specimens are somewhat glaucous. . . . Fruit not seen. This is very probably an alternate-leaved state of *E. melanophloia*, F.v.M."

In my opinion I think there can be little doubt but that Bentham's surmises are correct, and that the Mackenzie River "Box" is "an alternate-leaved state of *E. melanophloia*," and is identical with that at Narrabri, Nyngan, Dubbo, &c. His reference to *E. cinerea* resembling the opposite, sessile, cordate-leaved state of *E. melanophloia* proves conclusively that it was the "Argyle Apple" he recognised as that species, and not *E. pulverulenta*, Sims, as has been conjectured.

Although the gradation of leaf-form of *E. melanophloia* is towards *E. microtheca*, yet there is still wanting the connecting link between them.

That the two are closely allied there appears to be little doubt, but still the hiatus exists, and the connection, as far as my researches go, is not extant to-day.

The timbers are much alike in colour and figure, but differ in specific gravity and hardness. That of *E. microtheca* is more durable, harder, and not so easily worked as that of *E. melanophloia*.

The barks are identical in colour and texture.

The chemical constituents of the oils of these two species are also almost identical, so that the differences are to be found in the shape of the fruits, in the timber, and in the leaves, particularly in the dried state. In the field *E. microtheca* is always known vernacularly as "Swamp Box" or "Coolabah"; whilst *E. melanophloia* appears to be invariably known as "Ironbark" or "Silver-leaved Ironbark," although when found growing along with the former, and with all its leaves of the lanceolate form, it is regarded by bushmen as "Swamp Box." As it is this latter state that extends westward, it is very possible that the sessile, cordate leaved-form is the parent tree, and a survivor of the Miocene times when the main coast range remained above water. As the western plains were raised above the sea-level the lanceolate state probably developed.

The life-history of the foliage of *E. melanophloia* is thus identical with the Tasmanian species *E. Risdoni*, Hook. f., and *E. dives*, Schau., of the mainland.

The description of *E. melanophloia* should now read as follows :

A medium-sized forest tree attaining a height of 30 to 50 feet, with a very rough, hard, deeply furrowed, dark-coloured bark, extending nearly right out to the branchlets. Foliage glaucous or brownish-green, variable in form. Some trees preserve the sessile cordate-shaped form of leaf entirely, whilst others show a gradation into lanceolate ones. The western trees have entirely lanceolate leaves even on the "suckers." The former leaves are glaucous, whilst the latter are only rarely so, being generally of a pale yellowish or dull olive-green or pale brownish colour, slightly coriaceous, the margins sometimes recurved; venation

distinct, the lateral veins oblique, spreading, the marginal one removed from the edge. Branches axillary, or several together forming a terminal funicle, terete, or flattened, from 6 to 12 lines long, bearing from 7 to 8 flowers. Buds on a short, almost filiform pedicel. Calyx pyriform, $1\frac{1}{2}$ lines in diameter, slightly angular at the base. Operculum domed, shortly acuminate. Stamens very short; anthers small, parallel, opening by longitudinal slits. Pistil thick, clavate; ovary flat-topped. Fruit slightly angular at the base, truncate, globular or pyriform, about 3 lines in diameter, but less in the elongated form of the narrow-leaved variety, constricted at the orifice, giving it a kind of thin rim which dries red; valves occasionally exserted.

Hab.—The range of this species is now extended very much further west:—Nyngan, Girilambone, Cobar, Coolabah (W. Bäuerlen); Dubbo, Narrabri, Angledool (A. Paddison).

EXPLANATION OF PLATE XI.

Eucalyptus melanophloia, F.v.M.

- Fig. 1.—Specimen of the cordate, sessile-leaved state in flower.
- Fig. 2.—Specimen of the cordate, sessile-leaved state in fruit.
- Fig. 3.—Specimen of the cordate-acuminate-leaved state in fruit.
- Fig. 4.—Specimen of the lanceolate-leaved state in fruit.
- Fig. 5.—Specimen of the narrow-lanceolate leaves.
- Fig. 6.—“Sucker” leaves of the lanceolate state.
- Fig. 7.—Buds (enlarged).
- Fig. 8.—Section of bud (enlarged).
- Fig. 9.—Anther, back and front views.